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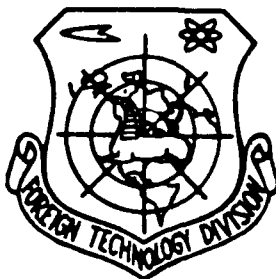


ANIMAL INFRARED TECHNOLOGY

by

Ba Shan

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By: Ba Shan

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ANIMAL INFRARED TECHNOLOGY
DONGWUDE HONGWAIXIAN JISHU

By: Ba Shan

Even if you had extremely good eyesight, human eyesight cannot exceed the limitations of visible light. Bees and flies, on the other hand, can see objects under ultraviolet rays with wavelength longer than that of violet light. Mice can sense X-rays with even shorter wave lengths. Snails withdraw their antennae when they run up against radioactive radiation. Rays with wave lengths longer than that of red light are heat rays. Many animals have "eyes" that can "see" heat.

Chrysochroa elegans often fly into fire. Recently it has been discovered that they have in their midbrain between 7- and 100 or more receptor reception nests which can receive infrared rays transmitted from far off fires and that they track these as they go.

There are some cuttlefish deep in the ocean which in addition to having eyes which can see visible light, on their tails they also have heat sensitive "eyes" which can keep out all light ways except for infrared rays - just like a light filter, and they only receive external heat (infrared rays).

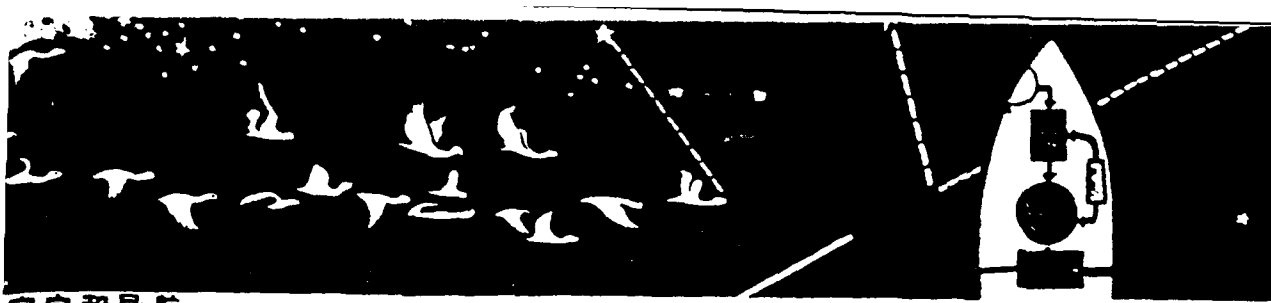
There are some snakes such as the five pacer, the copperhead, and especially the rattlesnake which have sensitive infrared ray positioning

abilities for tracking and catching birds, mice and other warm blooded animals (their bodies give off infrared rays). If a rattlesnakes eyes, ears, and nose were removed, and a light in a black paper bag were used in an experiment, when the light was off, it would not arouse its attention, but when the light is just turned on (gives off heat) the snake would alertly lift its head, and if the light bulb were moved nearer, it would immediately strike at the light bulb. If a hand were extended to one foot from the snake, it could cause the snake to react. The rattlesnake infrared ray locators are between the snakes nose and its eyes. This is a small pocket deep within the skull bone. It is divided into two small cavities, one inside and one outside, by a thin membrane (10 to 15 microns thick) covered with nerve terminal sheaths. The external cavity is like a funnel, and the larger end points at the target. The internal cavity has a narrow tube which leads to the top of the snakes head, exiting in the opposite direction from the external cavity, so the internal cavity maintains the same temperature as the surrounding air. When the body of a target such as a mouse gives off infrared rays they enter the external cavity and affect the membrane which is extremely sensitive to heat, there is a temperature differential between the internal and external walls of the membrane, and the snake instantly is on the alert. Furthermore, there are infrared locators on either side of the head as well, so the snake can detect the direction and distance of the target. Their sensitivity is such that they can sense a temperature change of 1/1000th of one degree Celsius.

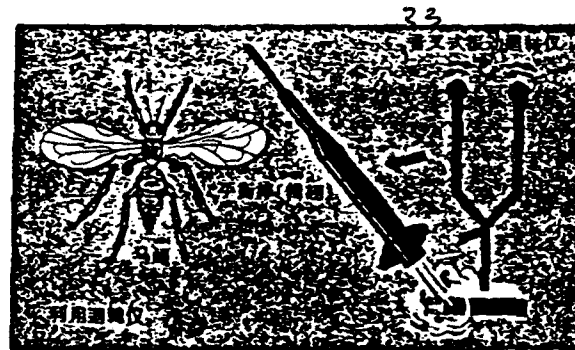
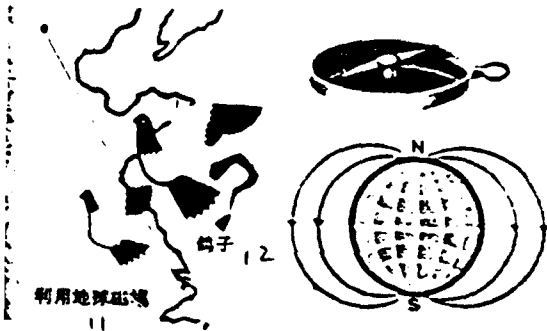
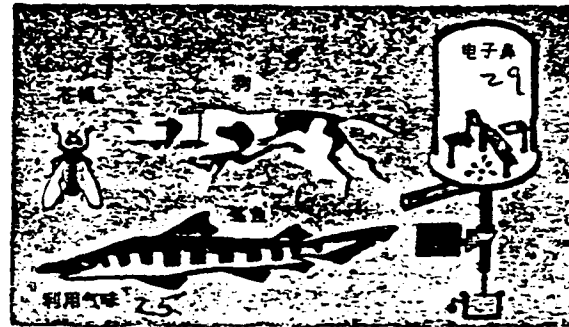
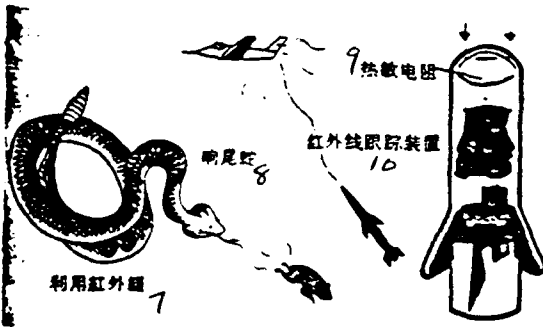
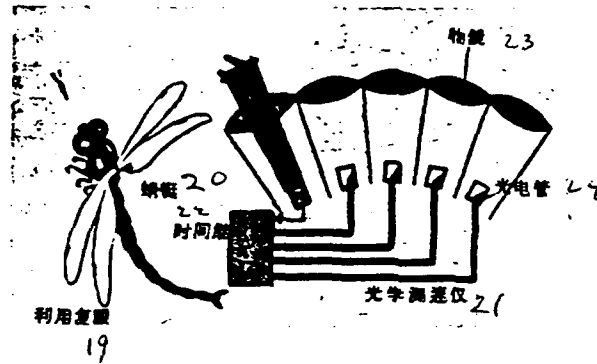
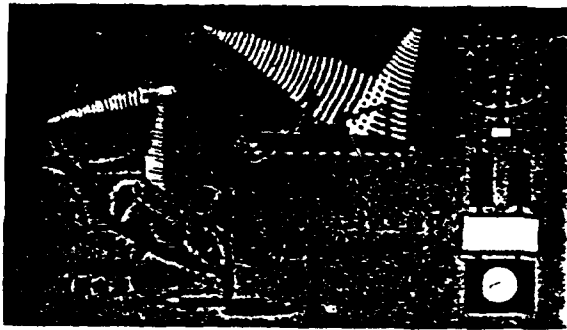
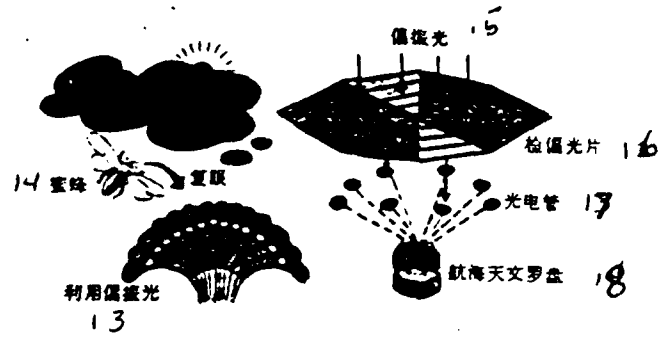
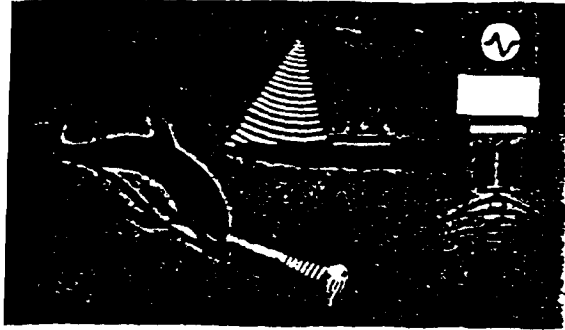
This infrared locating ability of animals is like the infrared automatic tracking equipment in a guided missile (see the color illustration), which can receive the infrared rays given off by the engine of the enemy aircraft, focus them onto a thermosensitive electrical resistor to produce a corresponding electrical signal, which is transmitted to the control equipment to keep the missile accurately following the target.

The antennae of insects are their noses. However there are some phenomenon which cause people to suspect that the sense is not necessarily

purely one of smell. The illustration on the left is of antenna of the emperor moth. The male moth is capable of chasing down the female moth from 10 kilometers away. at first it was believed that they relied on their sense of smell to find the female moth. However, how can they do this when facing a head wind? If the male moth is enclosed in airtight glass, the situation is different. Even if the male moth is very close to the female moth it is unaffected. This must lead one to believe that the sense of the insects is not purely one of smell. Some of their nerve fibers are capable of giving off infrared rays and some can receive infrared rays. After the male of this type of emperor moth receives the infrared signal given off by the female moth, the male moth tracks this signal. Also, there are probably strict boundaries to the wave-lengths emitted by each type of moth, otherwise, "cross breeding" would be unavoidable.



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